REMARKS

In the Office Action, claims 1-7 are rejected under 35 U.S.C. §102, and claims 8-20 are rejected under 35 U.S.C. §103(a). Claims 1 and 11 and are amended herein. Claims 4-5, 10, 14 and 20 have been cancelled without prejudice or disclaimer. Applicants believe the rejections have been overcome for at least the reasons below. A Petition for a Three Month Extension of Time is submitted herewith. The Commissioner is hereby authorized to charge deposit account 02-1818 for any fees which are due and owing.

In the Office Action, claims 1-7 were rejected under 35 U.S.C. §102(e) as being anticipated by U.S. Patent Application Publication No. 2002/0040805 to Swager et al. ("Swager"). Of the rejected claims, claim 1 is the sole independent claim.

Amended Claim 1 recites a functional molecular element. The functional molecular element includes a molecule with permittivity anisotropy and/or a dipole moment, a metal ion, and a conjugated molecule. The molecule with permittivity anisotropy and/or the dipole moment *and* the conjugated molecule *form a complex with the metal ion, and wherein conductivity of the conjugated molecule is changed by changing the orientation of the molecule with the permittivity anisotropy and/or the dipole moment by the action of the electric field.*

Swager generally relates to compositions which provide an insulated nanoscopic pathway. The pathway comprises molecules, polymers or nanoscopic particles capable of conducting charge integrated with nanoscopic switches which are capable of electronic communication with the charge-conducting species. (See, Swager, Abstract). The nanoscopic pathway can be used in a sensor ("particularly for sensing specific molecules"), where the switches can act as receptors for analytes. (See, Swager, Abstract and [0004]). That is, the sensor is used for detecting the presence of an analyte, where the presence of one or more analytes alters the conductivity of the nanoscopic pathway. Swager discloses that: "binding of analyte 159 by receptor 156d adds resistance to the wire, as schematically indicated by energy 160." (See, Swager, [0053]). Therefore, Swager does not teach or suggest altering the conductivity of a nanoscopic pathway by changing the conductivity of the conjugated molecule by changing the orientation of the molecule with the permittivity anisotropy and/or the dipole moment *by the action of the electric field*, as recited in amended Claim 1. Swager does not even

mention applying an electric field to change the conductivity of the nanoscopic pathway. Rather, Swager describes in paragraph [0063] changing orientation of the molecule by *charge transfer*.

For at least these reasons, Applicants respectfully submit that Swager fails to anticipate amended Claim 1, and Claims 2-3 and 6-7 that depend therefrom. Accordingly, Applicants request that the 35 U.S.C. §102 rejection of Claims 1-3 and 6-7 be withdrawn.

In the Office Action, Claims 8-10 were rejected under 35 U.S.C. §103(a) as being unpatentable over Swager. Claims 8-9 depend directly or indirectly from amended independent Claim 1 and are believed to be allowable for at least the reasons given above, and for the additional patentable elements recited therein.

In the Office Action, 11-14 and 16-20 were rejected under 35 U.S.C. §103(a) as being unpatentable over Swager in further view of U.S. Patent No. 5,608,556 to Koma et al. ("Koma"). Of these rejected claims, Claim 11 is the sole independent claim. Claim 11 has been amended to recite, at least in part, a functional molecular device, including: a molecule with permittivity anisotropy and/or a dipole moment; a metal ion; a conjugated molecule, the molecule with permittivity anisotropy and/or the dipole moment and the conjugated molecule forming a complex with the metal ion; an electric field applying means that applies *an electric field to the molecule with permittivity anisotropy and/or the dipole moment*; and an input/output means for the conjugated molecule, wherein a conductive path is formed by the conjugated molecule and *conductivity of the conductive path is controlled by changing the electric field that acts upon the molecule with the permittivity anisotropy and/or the dipole moment.*

As mentioned on page 5 the Office Action, Swager does not disclose an electric field applying means that applies an electric field to the molecule with permittivity anisotropy and/or the dipole moment. In addition, Swager fails to disclose or suggest wherein a conductive path is formed by the conjugated molecule and conductivity of the conductive path is controlled by changing the electric field that acts upon the molecule with the permittivity anisotropy and/or the dipole moment, as described above with respect to amended Claim 1.

Koma generally relates to a liquid crystal display and a method for controlling the orientation of the liquid crystals to improve viewabililty of the display screen from a variety of angles. (See, Koma, Abstract). However, Koma fails to cure the deficiencies of Swager because Koma does not disclose or suggest wherein a conductive path is formed by the conjugated

molecule and conductivity of the conductive path is controlled by changing the electric field that acts upon the molecule with the permittivity anisotropy and/or the dipole moment.

In addition, Applicants respectfully submit that Koma is not properly combinable with Swager. The Office Action alleges in multiple sections that Koma and Shanks are analogous art with Swager because "they are from the same field of endeavor, devices using liquid crystal molecules." (See, Office Action, pg. 5). Swager lists a wide variety of materials that can function as a dielectric (which has a high resistance and is *used to isolate the nanoscopic pathway 4)*. (See, Swager, Fig. 1, [0062] and [0072]-[0073]). For example, Swager describes that the dielectric may be a polymer, a ceramic, a gas (such as helium, neon, argon, or nitrogen), or a liquid crystal phase requiring the addition of solvent to provide anisotropic orientation of the crystals. (See, Swager, [0073]). The liquid crystalline phase is used to align the nanoscopic pathways to create isolation and positioning of the switching elements. This purpose and use is very different from the use of liquid crystal molecules in Koma. As stated in the Office Action, the liquid crystals in Koma are used in liquid crystal display (LCD) applications. In general, in LCD applications, when a voltage is applied across the electrodes, a torque acts to align the liquid crystal molecules parallel to the electric field, distorting their structure allowing more or less light through the liquid crystal layer. By controlling the voltage applied across the liquid crystal layer in each pixel, light can be allowed to pass through in varying amounts, correspondingly illuminating the pixel to a certain degree. Thus, the orientation of the crystals relate to changing the amount of light transmittance and does not affect the conductivity of a conductive path of a functional molecular element, as recited in the presently claimed invention.

Therefore, Applicants respectively submit that despite the fact that both Koma and Swager mention the use of liquid crystals, they are not from the same field of endeavor. Koma relates to a method for detecting the presence of an analyte (i.e., a sensor for sensing particular molecules), whereas Koma relates specifically to a method for orienting crystals in a liquid crystal display device to provide for an improved viewing angle by a user. In other words, it would not be obvious to apply the teaching of controlling the orientation of the crystals in Koma with an electric field to change a viewing property, with the analyte sensor in Swager. Accordingly, Applicants respect that Koma and Swager are not properly combinable.

For at least the reasons above, Koma fails to cure the deficiencies of Swager. Accordingly, Applicants respectfully request the withdrawal of the 35 U.S.C. §103(a) rejection of Claims 11-13 and 16-19 in view of Swager and Koma.

In the Office Action, Claim 15 is rejected under 35 U.S.C. §103(a) as being unpatentable in view of Swager, Koma and in further view of U.S. Patent No. 4,109,241 to Shanks ("Shanks"). Similar to Koma, Shanks also relates to liquid crystal displays. Shanks is relied on solely for the alleged teaching of a high-frequency electric field applied to the complex prior to applying the electric field. Therefore, Shanks fails to cure the deficiencies of Swager and Koma, as discussed above, even assuming that Shanks, Swager and Koma are properly combinable.

Accordingly, Applicants respectfully request the withdrawal of the 35 U.S.C. §103(a) rejection of Claim 15 in view of Swager, Koma and Shanks.

An earnest endeavor has been made to place this application in condition for formal allowance and in the absent of more pertinent art such action is courteously solicited. If the Examiner has any questions regarding this Response, Applicants respectfully request that the Examiner contact the undersigned.

Respectfully submitted,

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